

Appln. No. 09/820,778

Amendment dated August 20, 2004

Reply to Office action of May 20, 2004

REMARKS

Claims 32-93 presently appear in this case. No claims have been allowed. The official action of May 20, 2004, has now been carefully studied. Reconsideration and allowance are hereby respectfully urged.

Briefly, the present invention relates to a reactive probe chip for detecting target functional molecules. A first carrier probe, in the form of porous particles, is prepared having a first reactive substance capable of bonding a first target molecule immobilized within the pores thereof. A second carrier probe, in the form of porous particles, is also prepared having immobilized within the pores thereof a second reactive substance capable of bonding a second target molecule. The first and second carrier probes are immobilized on a surface of a substrate material in order to form the reactive probe chip. This probe chip is preferably a DNA chip having a plurality of different carrier probes, each disposed in a discrete microcompartment of the substrate.

Claims 32-35, 39, 40, 41, 44, 45, 46, 48-51, 54-57, 60-62, 64-66, 70-72, 75-77, 79, 80, 85-88 and 90-93 have been rejected under 35 U.S.C. §102(b) as being anticipated by Findlay. The examiner states that Findlay teaches a reactive probe chip with a plurality of probes on a porous carrier where the first reactive substance is immobilized within pores and capable of binding to a target molecule, and a second carrier probe is immobilized within pores of a carrier, wherein the second reactive substance is capable of bonding to

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a second target molecule, and a substrate material. The examiner states that the carrier probes are immobilized on the surface of the substrate material. This rejection is respectfully traversed.

Findlay does not anticipate any of the present claims, as Findlay does not disclose a porous carrier in the form of a particle, having immobilized within the pores thereof a first reactive substance, as is required by both independent claims 32 and 64. In Findlay, the substrate, such as substrate 20 in Figure 3 or substrate 50 in Figure 4, may be porous, but there is no disclosure that the probe carriers themselves are porous. Column 6, lines 31-40, indicates that the probes are prepared using water insoluble particles of regular or irregular shape, preferably spherical, to which the oligonucleotides are covalently attached. There is no suggestion whatsoever that these particles are porous, or that the reactive substance is immobilized within the pores of such a probe. In Findlay, the oligonucleotides are attached to the particles, and the particles are immobilized on the porous substrate. However, there is no disclosure of probes that comprise a porous carrier in the form of a particle, having immobilized within the pores thereof a reactive substance capable of bonding to a target molecule.

At column 6, lines 35-40, Findlay states that the particles can be prepared from any suitable material to which oligonucleotides may be covalently attached, including but not limited to "glasses, ceramics, metals, magnetizable materials,

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polymeric materials, sols, gels and other materials readily apparent to one skilled in the art." It is not apparent that any of these are porous, or that the reactive substance is immobilized within the pores thereof. As will be discussed below with respect to the rejection over Choong, the present claims have been amended to insert the proviso that the porous carrier is not silica gel. In order to anticipate, a reference must clearly disclose every feature of the claim. As there is no clear disclosure of the use of a carrier probe that is a porous carrier in the form of a particle, Findlay does not anticipate any of the present claims. Reconsideration and withdrawal of this rejection are therefore respectfully urged.

Claims 32-35, 39, 40, 41, 44-51, 54-57, 60-66, 70-72 and 75-78, 79-81, 84-87 and 90-93 have been rejected under 35 U.S.C. §102(e) as being anticipated by Choong. The examiner states that Choong teaches a reactive probe chip with a plurality of probes on a porous carrier, where the first reactive substance is immobilized within pores and capable of binding to a target molecule, and a second carrier probe is immobilized within pores of a carrier, where the second reactive substance is capable of bonding to a second target molecule. The examiner states that substrate material is also present and the carrier probes are immobilized on the surface of the substrate material. The examiner states that Choong teaches substrates that may be a porous carrier such as silica gel. This rejection is respectfully traversed.

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Choong teaches use of a porous media, such as hydrogel pads, but there is no disclosure in Choong that the porous material on which the reactive substance is immobilized is ever in the form of a particle. All of the present claims require that the carrier probe be a porous carrier in the form of a particle. In Choong, at column 5, lines 45-50, the porous media is defined as any media that allows molecules to move freely through it, and through which an electrical field can be propagated. At column 5, lines 51-63, the porous media is defined as hydrogel pads, macroporous gel/media, dielectric media, etc. This is in the nature of a two-dimensional probe, where movement in the direction of the electrical field is contemplated. This is not the same as a three-dimensional probe, such as a particle, in which the reactive substance is immobilized in all of the pores of the particle. At column 6, line 17, it is apparent that the substrate may be in the form of a bead, but the porous media is never disclosed as being in the form of a bead.

According to column 5, lines 54-56, the porous media may be a silica aerogel such as silica gel, sol gel, or SiO matrix. Previously appearing claims 39, 55, 70 and 85 specified that the porous carrier could be silica gel. In order to avoid any possibility of overlap with Choong, the present independent claims have now been amended to insert the proviso that the porous carrier of said first and second carrier probes is other than silica gel. Insertion of such a proviso is permissible in accordance with MPEP 2173.05(i) and

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In re Johnson, 194 USPQ 187,196 (CCPA 1977), cited therein.

As stated therein:

If alternative elements are positively cited in the specification, they may be explicitly excluded in the claims.

As Choong does not disclose that the porous material on which the reactive substance is immobilized is ever in the form of a particle, but are rather in the form of pads, and as the only overlapping material has been positively excluded from the present claims, the present claims cannot be anticipated by Choong. Reconsideration and withdrawal of this rejection are therefore respectfully urged.

It should be noted that Choong certainly nowhere discloses the use of a porous glass substrate. Porous glass would not work for the purpose of Choong. Therefore, at least claims 40, 56, 71 and 86 must be allowable, as they require that the porous carrier be a porous glass.

Claims 36, 37, 42, 43, 52, 53, 58, 59, 67, 68, 73, 74, 82, 83, 88 and 89 have been rejected under 35 U.S.C. §103(a) as being unpatentable over Choong. The examiner states that while Choong does not explicitly teach a pore size, one of ordinary skill in the art would have been motivated to optimize the pore size in Choong's porous carrier in order to increase the surface binding area. The examiner states that it was well known that pore size increases the

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surface area of binding of probes of microbeads. This rejection is respectfully traversed.

As discussed above, Choong does not teach the use of microbeads. Choong does not teach the use of beads at all for the purpose of the probe, and indeed does not teach any particles for the probe. Accordingly, it could not be obvious to optimize pore size as one would do for a microbead. In any event, all of the claims subject to the present rejection are free of Choong for the same reasons as discussed above with respect to the claims from which they depend. Accordingly, reconsideration and withdrawal of this rejection is respectfully urged.

Claims 38, 54, 69 and 84 have been rejected under 35 U.S.C. §103(a) as being unpatentable over Findlay or Choong, either in view of McGarry. The examiner states that neither Findlay nor Choong teach adhesive, but McGarry teaches the use of adhesive for affixing layers onto a substrate. The examiner considers that one of ordinary skill in the art would have been motivated to apply McGarry's adhesive to Findlay or Choong's array in order to bond the porous carrier onto the substrate. This rejection is respectfully traversed.

McGarry adds nothing to the deficiencies of Findlay and Choong, as discussed hereinabove with respect to the independent claims. Accordingly, claims 38, 54, 69 and 84 are

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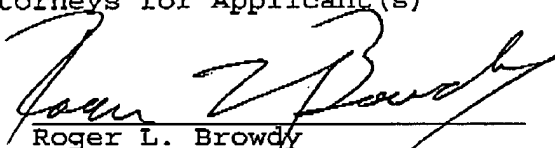
still allowable, for the same reasons as the claims from which they depend. Reconsideration and withdrawal of this rejection is therefore also respectfully urged.

It is submitted that all of the claims now present in the case clearly define over the references of record. Reconsideration and allowance are therefore earnestly solicited.

Respectfully submitted,

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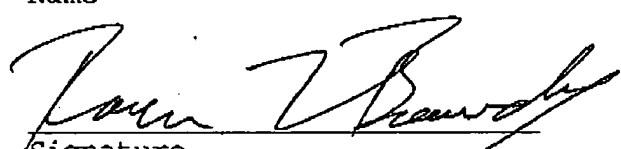

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